A Software Reliability Growth Model with Probability of Imperfect Debugging

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An assumption we frequently encounter in early models of software reliability is that no new faults are introduced during the fault removal process. However, there are situations in which new faults are introduced as a result of imperfect debugging. This study is an extension of Littlewood's work [1] alleviating this assumption by incorporating the probability measures such as system reliability, failure rate, time to failure, hazard rate and mean time to failure are in fact weighted averages of measures in Littlewood model and their closed form expressions are obtained. Based on these expressions we can evaluate the effects of p on reliability measures. Also a method to estimate the model parameters is presented.

Index terms - Fault removal, mixture distribution of failure rate, parameter estimation, probability of perfect error-correction, reliability growth, reliability measures, software reliability.